

Life Story of an American Pocket Knife

LITTLE WILLIE cut a fishing pole on the banks of the Wabash. Mazie, of the dark-brown eyes, sharpened her pencils preparatory to taking dictation from the boss. Harry opened a bottle (of ginger ale). George punched a hole in a piece of harness. Old Doc cut a sliver of steel from a workman's finger. Robert did some pruning on his young trees. Ed scraped the insulation off'n an electric wire (not live). Jim opened a can of sardines for wifey. Howard drove a couple of screws in the rocker. Percy manicured his finger nails. Sam sampled a bale of cotton in the compress. And each one did it with a pocket knife, you bet.

There's a Pocket Knife for Every Purpose

Hardly a man or a boy in the whole country but carries a knife of one kind or another. Leave your pocket knife at home some morning and see how well you get through the day without it. You'll be borrowing one before noon.

So when you take a trip through a cutlery plant with the editor, you will understand where all the thousands of pocket knives go which you see in your mind's eye passing through the various processes of production. What may interest you more will be the many complex operations required to turn out what on the surface appears to be a simple product. There are approximately 300 distinct operations required to manufacture a two-bladed jack knife.

Now let's see if we cannot obtain an adequate idea of how pocket knives are made, what materials go into their construction and what kind of people turn out the product. Most of us feel that pocket knives are just "knives." After the trip perhaps we'll change our minds.

So come with the editor on a visit to the largest, most up-to-date and best equipped plant of its kind in the United States, if not in the world—that of the Remington Arms Company, a name that stands for quality and service.

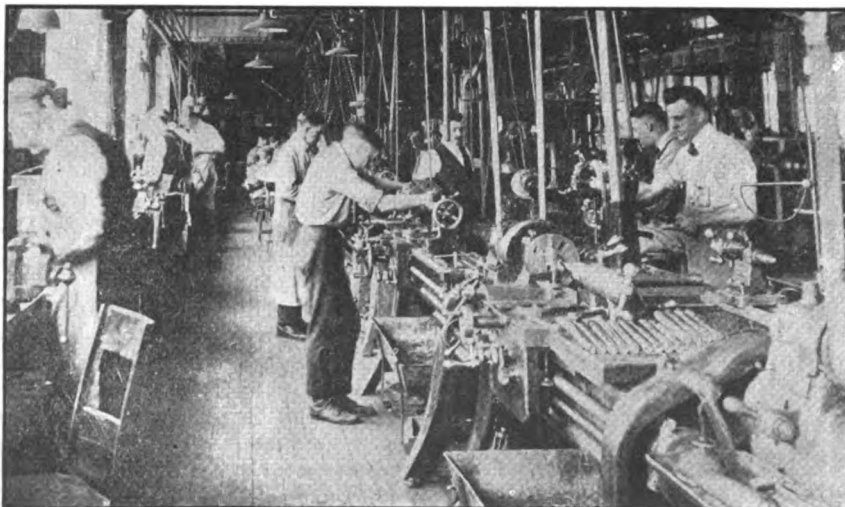
What's a Knife For?

"The prime function of a knife is to cut—to cut keenly." After all, the cutting edge of a knife is what the consumer buys notwithstanding the importance of each component part in relation to the other. This slogan is in the mind of every worker in the plant. There are still left in the United States a few industries in which pride of craftsmanship obtains. One of them is in cutlery manufacture.

The war has given a distinct impetus to American cutlery manufacturers, supplying both market and new producing facilities. The labor now recruited for the work was obtained quite largely from the arms and ammunition factories, and much machinery, sometimes entire plants, have been converted into cutlery factories. Some cutlers went into munition work after the first gun of the war was fired, and are now glad to get back to their old trade. When trained labor for certain operations cannot be found, men and women are trained for the work for which they are best fitted. The fine cutlery work must, of course, be performed by master cutlers.

Automatic machines are now being used in every operation where they can contribute to the actual improvement in the quality of the product, or reduce the production cost. Where machines for real automatic operations did not exist, Remington made 'em. For instance a new machine now inserts the brass pins in the knife handle and rivets them, was designed and built in the Remington works. This has been the policy in the arms and ammunition factory for years.

Standardization of parts is the basis of quality and quantity production. In pocket knife manufacture with the great variety of blades and handles which the market demands, standardization and interchangeability are es-



The light, neat, fully equipped tool room, where are made all dies and edge tools used in the factory, and where all repairing, maintenance and improvement of machinery is done. It is here that many of the automatic machines used in the factory have been devised and built.

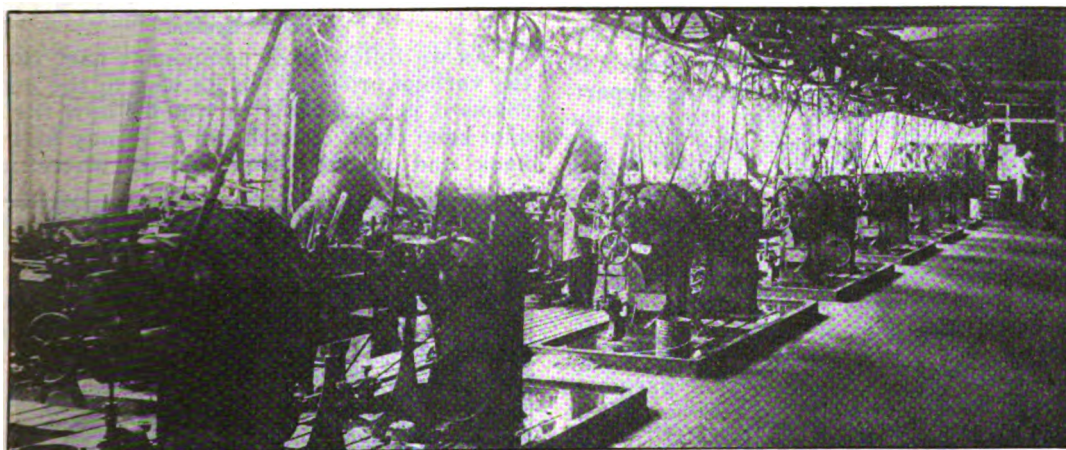
essential to produce a high quality product at a marketable price. The handle die, that is, the shape and size of the pocket knife handle, determines the class and purpose of the knife. It is very much like the last of a shoe. Several kinds of shoes, differing in color and style, may come from one last. And various styles of pocket knives may come from one handle die. The various parts of pocket knives are so standardized that the blades and other parts of one size and shape will interchange.

Begin With Raw Materials

In making our survey of the cutlery plant it is logical to begin in the general stock room where the raw materials are stored. Here we find such materials as blade steel, tool steel, brass, nickel silver, handle materials, grease, emery cake, buffing compounds and other raw products. Every lot of raw material must pass muster in the analysis and inspection of the Research Department before going into actual production. The Remington Company have

perienced in this one step in making pocket knife blades.

The blades are then passed on to be trimmed accurately to the desired shapes. After the blades are pierced, making ready for the rivet, they are forwarded to the heat treatment department where they are hardened and tempered. The patent methods of heat treatment governs the uniformity and quality in blades. Between the degree of too much hardness and the degree of too much softness there is a temperate degree which conduces to strength, toughness and keen-cutting requirements. Men are rare who are able to perform this work day in and day out, producing a high uniform standard. The long experience of the company in hardening and tempering gun parts, bayonets and other like products has been utilized to the utmost in this process. This room is screened so the light is very evenly diffused daylight in order that the operators may easily judge the color of the metal.



Machine Grinding. After the blades have been cut from raw steel, heat treated and tested, they go to the grinding department, where they are ground in automatic power machines. Many of these machines have been devised, perfected and built by Remington experts right at the plant.

maintained this department for years in connection with the manufacture of ammunition in their Bridgeport plant and are therefore able to undertake analysis and inspection of materials which would be prohibitive in point of cost in a plant operated on a small scale.

Passing to the cutlery tool room, we see where are made the dies, all of the tools and many of the automatic machines entering into the production of pocket knives. The program of the tool room is planned weeks in advance of the production processes.

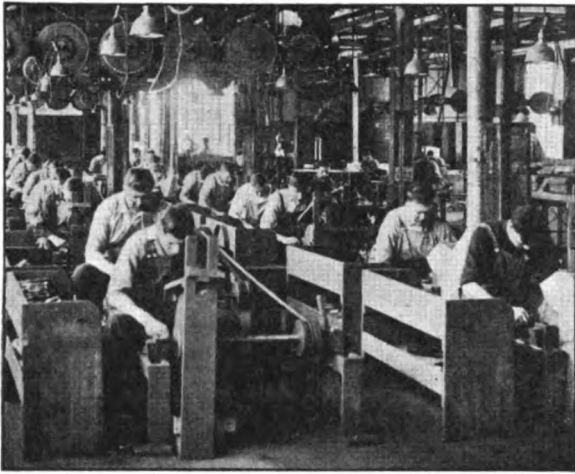
Blade Is the Vital Part

No knife can be better than its blades. In the manufacture of blades the steel is delivered to the cutters who cut the material into sections which can be conveniently handled in forging and the shaping process which follows. The forging is done by special workers long ex-

After the blades are hardened and tempered they are tested and straightened. In order to test the blades for flaws, each one is thrown against a block of steel. Blades which do not ring true are rejected. Following the straightening process by automatic machines, the blades are sent to the grinding department where they are ground on automatic power machines. After grinding, the tang (base) of the blade is die-stamped with the trademark.

Importance of Blade Finishing

The blade finishing department is one of the very interesting departments in the plant. Rows of blade finishers operating "double headers" and bending over whirling wheels perform one of the most important operations in knife making. Blade finishers are among the most expert and skilled workers in the entire plant. In this department fine blue glazing and



Blade Finishing Department. These workers have mill stones above their heads and before their eyes, but not around their necks. Their judgment, dexterity and muscular control must be very keen, for they finally grind the edge and polish the surface of the blade after it has been mounted. Sitting before their "double-headers," they perform one of the most important operations in knife making.

crocus polishing (mirror finish), is done. In another section of the blade finishing department "punch blades" are put through the finishing operations. The men who grind and finish these blades are highly skilled. Punch blades are for punching holes in leather. Each blade is proved in a piece of tough leather before it passes on.

Some of the abrasives and polishing compounds used are dry and some are wet. One of the operators who uses an emery paste which looks like mud, wears wooden "pants" and wooden shoes. These unique nether garments protect him from the sloppy abrasive. While this polisher may inspire amusement in the minds of visitors by reason of his apparel, he draws down a nice little envelope every pay day which many of us would like to bank. He knows just how much to take off each blade and gets well paid for the "know how." Wooden pants may never become vogue, but they're mighty handy around a cutlery works.

In all the rooms where grinding, glazing and polishing are done an exhaust system is in operation which sucks out the emery and other dust from the grinders so that the workmen are protected and the air is clear and clean. The dust is conveyed to a settling tank on the roof whence it goes to a place for collection and removal.

Springs, Bolsters and Linings

Springs are cut out, forged and heat treated in much the same manner as the blades. Following the shaping they are pierced and trimmed to length. They are then forwarded to the heat treating department where the same care is given them as to the blades. After this they go to the spring finishing room to be ground and have the inside polished. The

springs are ground and polished on the inside at this stage since this surface cannot be reached after the knife is assembled. They are then put into stock for assembly.

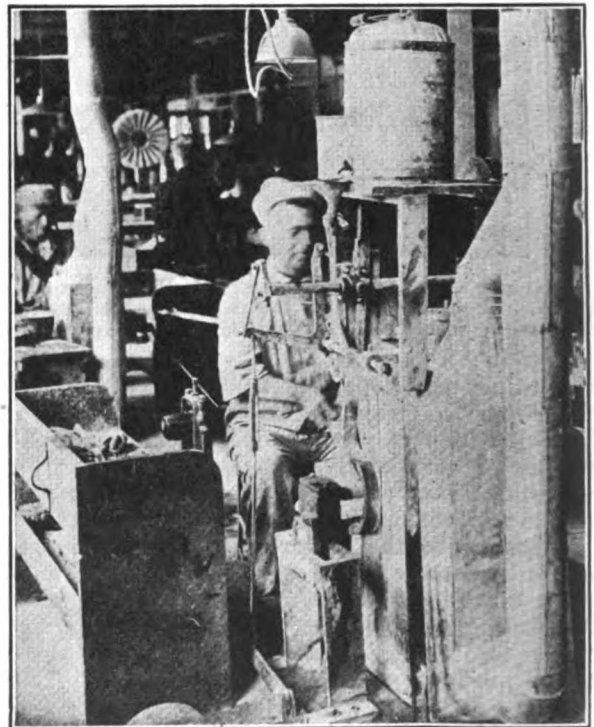
The linings or bolster scales are the (inside) linings of the handle and are first "blanked" from sheet brass, nickel silver or steel, holes being pierced for rivets at the same time. These linings conform to the die pattern of the respective shapes of the knives. The handles are fitted to the lining scales and bolsters are made of mother-of-pearl, stag, genuine stag, genuine buffalo horn and pryemite (nitro cellulose composition) in a large variety of colors.

The bolsters or tips are the metal trim on the outside and at the ends of the knife handle. They are pressed out of brass, steel or nickel silver and are shaped and trimmed by automatic process.

The component parts of the handle are assembled and pinned together by semi-automatic process. This combined product then goes to the cutlers for assembly and blade fitting and is considered a unit in the assembling process.

Tracer System

As we follow each component part through the various processes on its way to the cutlers' rooms it is reasonable to wonder how the foremen keep track of each job so it may be traced back and responsibility placed where it be-



Grease and Lime Brushing. This fellow, along with others all around him, performs a step in the many phased polishing process. Some operators wear "wooden pants" to protect them from the sloppy wet abrasives. An exhaust system sucks the emery and other dust from the grinders into a settling tank on the roof.

Hafting. Rows and rows of skilled workers with sensitive fingers, responsive hands, and trained eyes take the finished knife with its handle mounted and successfully grind, burnish and polish it before it goes to the inspection department.



longs in case of production troubles. Mistakes happen in the best organizations. A tracer system by means of vari-colored cards placed in each tray of component or assembled parts gives an accurate check on the work.

In the stock room the finished component parts are kept until forwarded to the assembling departments. From this point the product is inspected after each step in assembly.

Steps in Assembly

The first operation is to make up the handle. Pieces of ebony, stag, pyremite, pearl, etc., are fitted to the linings. This is known as "matching." The scales or outer parts of the handle are fastened to the linings by wire rivets. This operation is done on special automatic machines in the larger works, though in many pocket knife factories it still remains a hand operation.

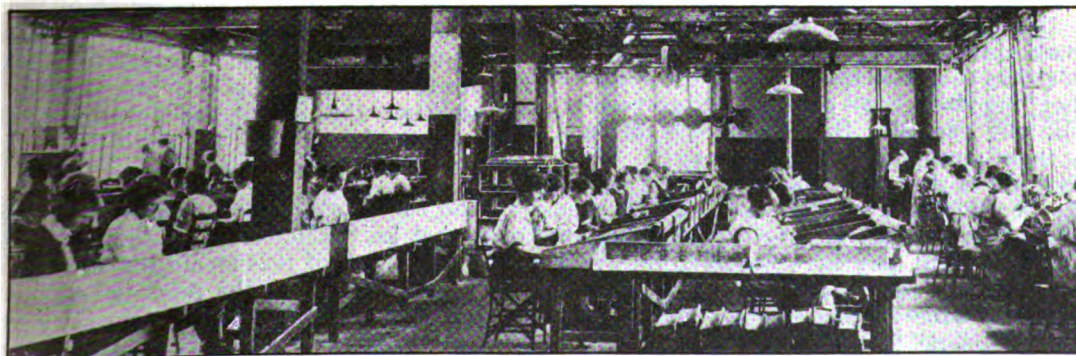
Then the handle is "routed" on one side by automatic shielding machines for the nickel silver shield, which is the metal plate found on most pocket knife handles. The next step is drilling the shield and attaching it to the handle.

The complete handle now goes to room where the springs and handles are assembled. They

are then forwarded to the cutlers, where the blades are inserted, adjusted and fitted. After the blades are riveted the knife is completely assembled, but is not yet a finished product by any manner of means.

Inspection and Finishing Important

During the process of assembly the product is in what is known as the "cutlers' room." These processes are very important steps in the production of a pocket knife, because the parts must be properly fitted together to turn out a quality product. All the expert and painstaking work done prior to assembly can be nullified by carelessly putting together the various parts. Operators go over each knife and see that they open and shut, or "walk and talk," properly, after which the knives are forwarded to the inspection department, where they are carefully scrutinized for any defects which may have been overlooked in former operations. The same close inspection given firearms and ammunition is given the products of the cutlery works, and it is because of this care that a high standard in quantity production can be maintained.



Wareroom Finishing. This department includes edge-setting, cleaning, etching, numbering, wrapping and packing. Most of this work is done by women with their greater delicacy of touch. The clean, airy, light building reflects itself in the work of the employees and so in the product.

**JAMES L. HEAD**

As District Manager for the Southwest, with headquarters at St. Louis, Mr. Head now occupies the desk which Western Sales Manager O. L. Reiersen vacated when he became President Reiersen and moved to New York. Mr. Head is a native Missourian and was such an enthusiastic sportsman that he was attracted to the Remington organization. He is a former amateur champion trapshooter of the United States. To show how the healthy, outdoor, sportsman's life lasts, Mr. Head's score for 1921 was 962, though he retired from the traps professionally ten years ago. Mr. Head enters the cutlery field with the same enthusiasm and ability that has characterized his work from the start.

After the inspectors have finished the knives are forwarded to the handle finishing, or "hafting," department, where the entire handle is finished by going through successive grinding, burnishing and polishing operations. Then the product returns to the inspection department for examination for minor flaws and defects.

The warehousing department includes the operations of edge setting, cleaning, etching, numbering, wrapping and packing. The knives first go through a process of rough cleaning, passing on to the etchers. Operators prepare them for etching the maker's name or brand on the front or "mark" side of the master blade by coating that side with a special varnish. Other operators make the impression of the name in etching machines. As the impression is made the varnish under the etching plate is removed automatically. Acid is then applied which etches the name into the steel. The blades are then immersed in an alcohol bath to remove the acid and varnish. Here also the blades are given their strong, keen cutting edges. Most of this work is done by women, who are better able to do fine work of this character by reason of greater delicacy of touch. The foreman of this department may have two daughters and a son working under him and other sons employed in other departments. This is not uncommon among those who devote their lives to cutlery, although it is found to a greater extent in England and on the Continent than in the United States.

After all, no matter how good a product a manufacturer makes, it is important that he should use discernment in the selection of his representatives.

It has been the invariable policy of the Remington Arms Co. to exercise the same care and discrimination in their sales representatives as they do in their products.

Hence a "Remington Man" is in keeping with the high quality of their products.

**H. R. PATTERSON**

District Manager and chief sponsor for Remington arms and cutlery in the seven states of the "Northwest Territory," with headquarters at Minneapolis. Mr. Patterson began with Remington when he was 22, and he has stuck for some 15 years, so you can see what each thinks of the other. He proudly points out that his school has been his fellow men and the experiences he has had with Remington goods as "missionary" and executive. He is most interested in the possibilities and advantages which the new cutlery line presents.

The next operation is numbering—stamping the number of each knife on the reverse tang of the master blade. After being cleaned once more the knives receive another inspection. Then they go to the buffing and polishing machines, which are operated by men. A final cleaning and inspection follows. All knives with the slightest defects are rejected.

Entire Pedigree Stamped on Carton

The product now goes to the packing rooms. The knives are transported in trays on trucks. Here they are placed in moisture-proof cabinets. In packing, each knife is wrapped in rust-proof paper and packed one-half dozen to the box. The boxes are sealed in "glassene" paper to prevent rust and are then packed two dozen knives to a carton. Each box of six knives has stencilled on the bottom a code number by which the product may be traced back in production to the time of assembly. The model number of the knife is stencilled plainly on the end label. In addition, the carton has a code number to indicate the labeler and packer.

An Aid to the Jobber

The use of a glassene wrapper on each box of pocket knives not only protects the contents from moisture but it is an indication to the jobber's stock clerk that the package has not been broken. The absence of the glassene wrapper indicates that one or more knives have been withdrawn from the box in making up assorted orders. This prevents short shipping of orders to the retail customer.

Lacking a recent and adequate picture of J. G. Heath last month, we were forced to use one that merely bore a slight resemblance. We were so overcome with shame after our edition was printed that we insisted he have this up-to-the-minute likeness "for our files," and we take this opportunity of making public apology and reparation for the injustice we perpetrated last month. Due to Mr. Heath's active and genial life, his friends say he actually grows younger with each recurring birthday anniversary, and this new picture is ample evidence of his perpetual youth, his continuously pleasant aspect, and his mysterious ability to grow handsomer every year.



J. G. HEATH

Most all jobbers have some system to check broken packages of goods, such as a pencil mark on the end label. The system fails, however, whenever a stock clerk breaks a package and forgets to mark the end label. On the other hand, the glassene wrapper is the signal of the full package. Its use eliminates checking by the box and puts the responsibility up to Remington instead of the clerk. Another advantage is found in the wrapper as a protection against dust and dirt. Provided the package has not been broken by the jobber, the retail dealer receives his pocket knives in boxes with fresh, clean labels. This is helpful in making an attractive window or case display.

A Brand New Product

In placing cutlery on the market Remington started with a clean sheet. Everything is new—new personnel, new methods, new equipment, new designs, new dies, new tools and new ideas. There are no musty traditions or archaic methods to hamper and inhibit the growth of the cutlery organization as the line is increased from year to year.

In any group of Remington district managers or leaders, Mr. Heath would be conspicuous by his absence, for he heads one of the largest as well as most important divisions of the sales territory—the 12 western states. He has made Remington products his life and his light for over 25 years, and he is one of those rare men in business who can make his work his play and his joy also. The men he does business with are the ones he plays with and who call him by his first name. It is under the direction of such master hands as Mr. Heath's that Remington arms and ammunition have gained and held their favor with the trade. The new cutlery line is being received in the same spirit and with the same warmth.